NAME

mkillum - compute illum sources for a RADIANCE scene

SYNOPSIS

mkillum [−n nprocs][rtrace options] octree [< file ..]
mkillum [rtrace options] −defaults

DESCRIPTION

Mkillum takes a prepared RADIANCE scene description and an octree and computes light source distributions for each surface, replacing them with secondary sources whose contributions can be computed more efficiently by *rpict(1)* and *rvu(1)*. This type of optimization is most useful for windows and skylights which represent concentrated sources of indirect illumination. *Mkillum* is not appropriate for very large sources or sources with highly directional distributions. These are best handled respectively by the ambient calculation and the secondary source types in RADIANCE.

If the −*n* option is specified with a value greater than 1, multiple ray tracing processes will be used to accelerate computation on a shared memory machine. Note that there is no benefit to using more processes than there are local CPUs available to do the work.

Remaining arguments to *mkillum* are interpreted as rendering options for *rtrace(1)*, to compute the light distributions for the input surfaces. These surfaces can be any combination of polygons, spheres and rings. Other surfaces may be included, but *mkillum* cannot compute their distributions.

By default, *mkillum* reads from its standard input and writes to its standard output. It is possible to specify multiple input files in a somewhat unconventional fashion by placing a lesser-than symbol ('<') before the file names. (Note that this character must be escaped from most shells.) This is necessary so *mkillum* can tell where the rendering arguments end and its own input files begin.

VARIABLES

Mkillum has a number of parameters that can be changed by comments in the input file of the form:

> #@mkillum variable=value option switch{+|-} ..

String or integer variables are separated from their values by the equals sign ('='). Options appear by themselves. Switches are followed either by a plus sign to turn them on or a minus sign to turn them off.

Parameters are usually changed many times within the same input file to tailor the calculation, specify different labels and so on. The parameters and their meanings are described below.

o=*string*   Set the output file to *string*. All subsequent scene data will be sent to this file. If this appears in the first comment in the input, nothing will be sent to the standard output. Note that this is not recommended when running *mkillum* from *rad(1)*, which expects the output to be on the standard output.

m=*string*   Set the material identifier to *string*. This name will be used not only as the new surface modifier, but it will also be used to name the distribution pattern and the data files. The distribution name will be *string* plus the suffix ".dist". The data file will be named *string* plus possibly an integer plus a ".dat" suffix. The integer is used to avoid accidently writing over an existing file. If overwriting the file is desired, use the *f* variable below.

f=*string*   Set the data file name to *string*. The next data file will be given this name plus a ".dat" suffix. Subsequent files will be named *string* plus an integer plus the ".dat" suffix. An existing file with the same name will be clobbered. This variable may be unset by leaving off the value. (See also the *m* variable above.)

a   Produce secondary sources for all of the surfaces in the input. This is the default.

e=*string*   Produce secondary sources for all surfaces except those modified by *string*. Surfaces modified by *string* will be passed to the output unchanged.

i=*string*   Only produce secondary sources for surfaces modified by *string*.

n   Do not produce any secondary sources. All input will be passed to the output unaffected, except any void surfaces will be removed.

b=*real*   Do not produce a secondary source for a surface if its average brightness (radiance) is less than the value *real*.

c=*{d|a|n}* Use color information according to the given character. If the character is *d*, then color information will be used in three separate data files and the distribution will be fully characterized in terms of color. If the character is *a*, then only the average color is computed and the distribution will not contain color information. If the character is *n*, even the average distribution color will be thrown away, producing secondary sources that are completely uncolored. This may be desirable from a color-balancing point of view.

d=*integer* Set the number of direction samples per projected steradian to *integer*. The number of directions stored in the associated data file will be approximately this number multiplied by pi for polygons and rings, and by 4pi for spheres. If *integer* is zero, then a diffuse source is assumed and no distribution is created.

s=*integer* Set the number of ray samples per direction to *integer*. This variable affects the accuracy of the distribution value for each direction as well as the computation time for *mkillum*.

l{+|-}   Switch between light sources and illum sources. If this switch is enabled *(l+)*, *mkillum* will use the material type "light" to represent surfaces. If disabled *(l-)*, *mkillum* will use the material type "illum" with the input surface modifier as its alternate material. The default is *l-*.

EXAMPLES

The following command generates illum's corresponding to geometry in the files "it1.rad" and "it2.rad":

    mkillum −ab 2 −ad 1024 −av .1 .1 .1 basic.oct "<" it1.rad it2.rad > illums.rad

The output file "illums.rad" would then be combined with the original scene geometry to create a more easily rendered composite.

ENVIRONMENT

RAYPATH   the directories to check for auxiliary files.

AUTHOR

Greg Ward

ACKNOWLEDGEMENT

Work on this program was initiated and sponsored by the LESO group at EPFL in Switzerland.

SEE ALSO

genBSDF(1), oconv(1), rad(1), rpict(1), rtrace(1), rvu(1)